

REMARKS

1. Objections to the Claims

In the Office Action, the Examiner has objected to and rejected Claims 1-13 and 21-26 under 35 U.S.C. §112 as being indefinite for failing to recite a particular surface on which the conductive pattern is disposed on the surface of the tape. Claim 1 and Claim 21 have been amended to more particularly point out the features of the present invention, and therefore Applicants believe the rejection has been overcome.

2. Rejections under 35 U.S.C. §102

I.) In the Office Action, the Examiner has rejected Claims 1, 5, 7-14, 21, 22 and 24-26 under 35 U.S.C. 102(b) as being anticipated by Hughes (U.S. 6,403,881). Applicants respectfully traverse the above rejections.

Amended Claim 1 (and similarly dependent Claims 2-13, as well as independent Claims 14, 21 and dependent Claims 22-26) recites "a tape having a conductive pattern disposed on a surface thereof." The substrate 2 of Hughes is not a flexible tape substrate at all, but is rather a stiff laminate circuit board material (See Hughes, Col. 3, Lines 32-34). Therefore, Claims 1-14 and 21-25 as Amended are not anticipated by Hughes.

Further, the Examiner states that Hughes teaches a support structure formed by a thin metal sheet having an aperture for accepting the die. The support structure 9,10 of Hughes is formed by frame layer 3, which is a laminate material similar to that of substrate 2 (See Hughes Col. 3, Line

36). While there is a metallized surface on frame layer 3, frame layer 3 is not a thin metal sheet as recited in Claim 5. Therefore, in addition to the reasons stated above for allowability of the independent claims, Claim 5 should be allowed.

Also, the Examiner states that Hughes teaches a transparent cover bonded to the die by optically transparent adhesive as recited in Claims 7, 8 and 24. The transparent cover of Hughes is supported by bonding to the support structure. Hughes also teaches that the cavity 5 may be filled or partially filled with a protective compound such as UV cured acrylic. Such filling is not the adhesive bonding as performed in some embodiments of the present invention, where the transparent cover is bonded directly to the die with a thin layer of optically transparent adhesive. Further, Hughes Col. 5. Line 30 et seq. describes the manufacturing process of Hughes. It is clear that since the filling of cavity 5 is performed prior to the attachment of glass lid 12 by glue provided on strips 9, that the filling of cavity 5 with a protective compound does not bond glass lid 12 to the assembly at all. Therefore, in addition to the reasons stated above for allowability of the independent claims, Claims 7, 8 and 24 should be allowed.

II.) In the Office Action, the Examiner has rejected Claims 1-4, 13, 14, 21, 25 and 26 under 35 U.S.C. 102(b) as being anticipated by Wetzel et al.

(U.S. 6,011,294). Applicants respectfully traverse the above rejections. Amended Claim 1 (and similarly dependent Claims 2-13, as well as independent Claims 14, 21 and dependent Claims 22-26) recites "a

plurality of external contacts disposed on a bottom surface of the tape opposite the top surface and electrically coupled to the conductive pattern through holes formed in the tape from the bottom surface to the top surface, for providing an electrical interface to the die." Wetzel teaches a flexible tape circuit that extends beyond the circuit package to form a typical flexible printed circuit connector, not a structure with through holes for forming contacts from a top surface conductor to a bottom surface of the tape substrate. Therefore, Claims 1-14 and 21-25 as Amended are not anticipated by Wetzel.

III.) In the Office Action, the Examiner has rejected Claims 1, 6, 9, 10, 13, 14, 21, 23, 25 and 26 under 35 U.S.C. 102(b) as being anticipated by Bauer et al. (U.S. 6,130,448). Applicants respectfully traverse the above rejections. Bauer is directed to a completely different structure than the structures disclosed and claimed by the applicants. Amended Claim 1 (and similarly dependent Claims 2-13, as well as independent Claims 14, 21 and dependent Claims 22-26) recites "a tape having a conductive pattern disposed on a surface thereof." The Examiner asserts that Bauer teaches a tape 28, but Bauer (as does Hughes, as argued above) teaches a rigid substrate such as "glass or ceramic" (See Bauer col. 5. lines 4-5).

Secondly, Amended Claim 1 (and similarly dependent Claims 2-13, as well as independent Claims 14, 21 and dependent Claims 22-26) recites "a plurality of external contacts disposed on a bottom surface of the tape opposite the top surface and electrically coupled to the conductive pattern through holes formed in the tape from the bottom surface to the top surface, for providing an electrical interface to the die." Bauer teaches

a rigid substrate having external contacts disposed at the edges of substrate 28, not a structure with through holes for forming contacts from the top surface conductor on substrate 28 to a bottom surface of the substrate. Therefore, Claims 1-14 and 21-25 as Amended are not anticipated by Wetzel.

Applicants respectfully submit that Applicants' claimed invention is deserving of patent protection because it describes a useful and functioning structure, which is patentably distinguishable over the prior art.

CONCLUSION

In conclusion, Applicants respectfully submit that this Amendment, in view of the Remarks offered in conjunction therewith, are fully responsive to all aspects of the objections and rejections tendered by the Examiner in the Office Action. Applicants respectfully submit that they have persuasively demonstrated that the above-identified Patent Application, including Claims 1-14 and 21-26 are in condition for allowance. Such action is earnestly solicited.

It is not believed that this Amendment letter requires any fees, but if there are any fees incurred by this Amendment Letter, please deduct them from our Deposit Account NO. 23-0830.

Respectfully submitted,



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REDACTED COPY OF AMENDED CLAIMS

1. (Amended) An optical integrated circuit, comprising:

a tape having a conductive pattern disposed on a top surface thereof;

a die mounted to the top surface of the tape and electrically coupled to the conductive pattern for providing an electronic function of the integrated circuit;

a support structure surrounding the die and bonded to the top surface of the tape;

a transparent cover mounted over the die such that an optically active surface of the die is accessible through the transparent cover; and

a plurality of external contacts disposed on a bottom surface of the tape opposite the top surface and electrically coupled to the conductive pattern through holes formed in the tape from the bottom surface to the top surface, for providing an electrical interface to the die.

4. (Amended) The optical integrated circuit of Claim 2, wherein the conductive pattern comprises an etched copper pattern on the top [a] surface of the flexible plastic tape.

12. (Amended) The optical integrated circuit of Claim 11, wherein the conductive pattern is disposed on the top [a] surface of the tape opposite the solder balls and wherein the solder balls contact the conductive pattern through the perforations.

14. (Amended) An optical integrated circuit, comprising:

a tape having a conductive pattern disposed on a top surface thereof;

a die mounted to the top surface of the tape for providing an electronic function of the optical integrated circuit;

a transparent cover mounted over the die such that an optically active surface of the die is accessible through the transparent cover;

a plurality of external contacts disposed on a bottom surface of the tape opposite the top surface and electrically coupled to the conductive pattern through holes formed in the tape from the bottom surface to the top surface, for providing an electrical interface to the die; and

means for mounting the transparent cover over the die.

21. (Amended) An optical integrated circuit, comprising:

a tape having a conductive pattern disposed on a top surface thereof;

a die mounted to the top surface of the tape and electrically coupled to the conductive pattern for providing an electronic function of the integrated circuit;

means surrounding the die and bonded to the top surface of the tape for providing support;

means mounted over the die for allowing an optically active surface of the die to be accessible through the means mounted over the die; and

a plurality of external contacts disposed on a bottom surface of the tape opposite the top surface and electrically coupled to the conductive pattern through holes formed in the tape from the bottom surface to the top surface, for providing an electrical interface to the die.